

**A systematic study of low and medium p_T direct photon production
in the PHENIX experiment**

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Direct photons are emitted during the entire evolution of nucleus-nucleus collisions and escape freely from the initial hot zone, providing the possibility to test directly its properties. At low and medium transverse momentum, thermal direct photons and those from jet-medium interactions are expected to dominate and can be used to estimate the temperature and energy density of the hot matter. The direct photon yield measured in p+p and d+Au collisions at the same energy serves as a baseline for estimating the contribution of pQCD photons in Au+Au collisions.

The PHENIX experiment has the capability to measure not only real but also virtual photons through e^+e^- pairs. PHENIX can apply a variety of measurement techniques ranging from the classical statistical subtraction and tagging methods to a newly employed technique to measure internal conversions, an approach based on photon measurement through external conversion in the detector material, and direct photon HBT correlations. These methods provide important cross checks and complement each other, extending the transverse momentum range of the measurement.

In this talk we present the latest results obtained by PHENIX on low and medium p_T direct photon production in p+p, d+Au, and Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV.